

DRAGON USER

International edition

The independent Dragon magazine

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March 1985

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Editorial

When the Dragon was first launched, one of the most common queries was nothing to do with the operating system or machine code, it had to do with the whereabouts of the mushroom in Madrox and the Minotaur.

Some of the earliest independent Dragon software houses were also heavily adventure based, notably Salamander Software, creator of the invisible Dan Diamond.

FOR SOME REASON there is a remarkable affinity between Dragon owners and adventure games. Many of the recent game releases have been adventure orientated. Incentive have recently converted its Kat Trilogy to the Dragon, while both Adventure International and Channel 5 have also released adventures. Now Compuserve has launched a version of the classic Colossal Cave.

This is not to say that Dragon owners are not interested in arcade games or more serious applications. There are so many standard shoot 'em up games for the Dragon on there are far more mazes. Merle Miller, Grid Runner and Laser Zone have all been converted to the Dragon.

However, the adventure market still seems to have an immediate attraction for Dragon owners: Whitesoft's Ring of Darkness and Return of the Ring have built up a dedicated band of followers, as has Dragon Data's El Dulario.

Given the depressed state of the Dragon market generally, it is nice to know that there are some areas which are still relatively busy. Happy adventuring!

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Revenge

ROMMEL'S REVENGE is a new game from Design Group for both Dragon and Tandy owners. Originally written for the Spectrum, *Rommel's Revenge* is a version of the *Blitzkrieg* strategy game.

The game, which costs £7.95, features 30 graphics with full composite.

The object of the game, which is set on a futuristic battlefield, is to destroy the enemy tanks pouncing relentlessly towards you. The enemy tanks are nervous on wheels and come in two types: standard and super-deadly. Both types are eliminated by mode fire control tanks which never fire over the battlefield.

You can send enemy shells by using the blocks and pyramids scattered around the battlefield as cover. But your only defence against an anti-tank missile is

ROMMEL'S REVENGE



to destroy it before it destroys you.

The game, which is joystick compatible, is available from Tandy dealers or direct from Design Group, 2 Ashton Way East, Harrington, Sunderland SR4 3PX.

Bulletin Board

SPRAN LLOYD, editor of *Starline's Dragon Reader*, is setting up a bulletin board for Dragon owners. It will run on a Dragon 64 with two disk drives and a British Telecom fax machine, another telephone line.

Dragon owners wishing to access the bulletin board will need a 300-900 baud modem and an RS232 interface.

Anyone who wishes to contribute to the bulletin board or who has ideas about the kind of services it could offer is invited to contact Brian Lloyd at 3 Hornbeam Walk, Wilmslow, Cheshire.

German network

A GERMANY Dragon club is looking to expand its contacts with Dragon owners in other countries. Interested parties should contact Rainer Hefig, Thorncroft 10, 30626 Bens, Datteln, West Germany.

Graphic design displays

GACH SOFTWARE has been doing a graphic design job for designing home screen displays. The job consists of 100 sheets of A4 paper marked out in a 200 x 100 series. It costs £2.95 or £3.50 for two from 84 Prince Street, Rochdale, Lancashire.

Colossal adventure

COMPUTER-8081 (C80) writes a version of the classic *Colossal Cave* adventure for the Dragon 64. The adventure is text-based and only available on disk.

There is no text or save feature, due to the lack of space. The game, which should be on display at the 1985 show, costs £3.95 from Computers, PC3 Box 189, 2880 Green Lanes, London NW3 5TH.

Modems, networks and languages

THOMAS TELEVISION has launched a weekly eight-part television series for serious computer users. The series, which starts on Channel 4 on February 11 at 9:00 pm, will look at modems, networks and languages such as Logo and Prolog.

In addition, the series, 4 Computer Skills, will launch a new Postal service for

schools. Schools, other fee units will receive tapes, posts and data transmissions of software over the air. OY in Brussels will learn how to control a light pen.

Finally, the series will be running an interactive bulletin board through Nottingham Building Society's Homelink network.

New releases

LANCSTER BASED Shelby Computer Games has launched three new games in its *Dragon/Gold Range*. *Olympic* is a sports simulation which consists of 100 different events in which you have to compete against the clock. *Cosmic Crusader*, with 34 screens of action, is an inter-planetary shoot 'em up, while *Ruby Rabbit* is a strategy game where you must steal a precious stone protected by snakes, guards and mines. All three games cost £3.95.

Ruby, which now has 17 titles to its credit, is converting its games to the Tandy Colour Computer. *Ruby Rabbit*, *Stone the Devil* and *Bole* are already available for the Tandy also.

COSMIC CRUSADER



DRAGON 64

priced at £3.95.

In addition, Shelby hopes to show another three new games for the Dragon at the 1985 show in March.

Power-up

TOUCHMASTER has increased the price of its power pack for the Dragon. The new cost of the pack is £9.95 plus £1.50 P&P and not £7.95 as reported in *Dragon User* last month.

The company also announced that it is unable to help with Dragon hardware problems. The Dragon only freephone line has been disconnected and all enquiries to the company should be made on 0655 744770.

The Demon

COTSWOLD Computers are to write Dragon software for the Unicom-modem. The mod, in which it being assumed the Demon runs for £19.95, has Dragon User December

1984) and is produced by the Rushworth Sales group — the organisers of the 1985 show.

It is expected that Cotswold will be exhibiting the mod, and sponsors at the show which is being held at the Royal Horticultural Hall in London, from March 30-31. Further details from Rushworth Sales on 01-933 1682.

Scramble

THE SCRAMBLE program in the February edition of *Dragon User* contained two errors. Line 1498 was misprinted. The correct data listing is:

DATA 0 8 33 108 6 0 0 0 0 189 241 8
Secondly, half of line 1080 was not printed. The complete line should read:

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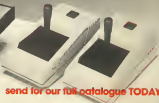
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FLIGHT? SIMULATORS have come a long way since the early instruments-oriented games. The latest programs utilize real-time 3D graphics and accurately direct the responses of a plane in flight.

Microcatal has just released *Modes of Flight for the Dragon*, which comes in an impressive over-sized retro style box with a full-size flight manual. The simulation is "vector" oriented — you see the view out of the window in real-time 3D graphics which move as the plane rises or descends. The program takes its title from the fact that there are nine worlds which you can fly around in. These "worlds" are in effect just different landscapes, including equatorial, arctic, island, and gulf. There is also a special practice world which is completely empty, apart from the airport.

Getting realistic 3D graphics on the Dragon may sound like a minor miracle, but I have heard from a number of individuals to achieve this. All the graphics are shown as wire-frame drawings, rather than solid objects. The technique used is to define a wire world as a series of points on a three-dimensional model. These points are then translated into the screen's frame of reference and projected on to the screen.



The resulting points are then joined up by lines. This method is a very memory-efficient technique and works quite well. However, some users might find it hard to associate the 3D effect with just wire frames.

Modes of Flight is written entirely in machine code and requires two potentiometer joysticks. Please note that some switch-type joysticks that are now available for the Dragon cannot be used as the simulator needs to sense the position of the sticks.

After a fancy title page showing your plane which is apparently unengaged in sport (after doing an office roll, you are presented with the "Get in the cockpit" screen). This allows you to define which world is at the time you wish to fly in. It is also possible to change the wind speed and direction, as well as setting the ceiling below which the ground and other land marks are visible. Pressing the Enter key starts the simulation.

The upper half of the display (Period 4) shows the view out of the aircraft's window, the lower half shows all the instruments. The airport view is always the same in every world with the runway

Brown Codge takes to the skies in the review of two flight simulators

control tower, fuel stations, and two station around the keyboard. It is possible to pan around (the equivalent of moving your head) left to right or up and down. This is controlled by the arrow keys. Another useful viewing option is the "finder" which gives a bird's-eye view of the current world with a cross marking the plane's position. You can even zoom in on the radar.

The instrument panel shows all the essential flight information, such as a fuel gauge, speed, engine speed, artificial horizon (shows which way up you are), altimeter, compass, rate of climb, descent indicator and landing gear indicator.

The up/down movement of the left joystick controls the throttle, and the left/right movement controls the rudder. The up/down movement of the right joystick con-

Another flight simulator of a slightly different type is Microcatal's *747 Flight Simulator* by DACC Ltd. As is obvious from the title, this program attempts to simulate the operation of a 747 Jumbo Jet. Again, two potentiometer joysticks are needed to use the program and the display is a Period 4 screen with the upper half showing the pilot's view and the lower half the instrument panel.

The opening instructions come in a small booklet. The same title as the cassette case. I was somewhat surprised to see that the program is written in Basic, and this is reflected in the speed and complexity of the graphics.

The first six pages of the manual describe the theory of flying a 747 in a well-written introduction. Though it doesn't refer to the program or its operation at all, there comes a description of the instrument panel. None of the instruments are identified, which is unfortunate as there are 16 small dials on the right-hand side of the display alone giving information about each of the fuel jet engines. The other main gauges displayed are compass, differential horizon, compass, speed, altitude, rate of turn, and climb and landing gear indicators. But, each instrument is described in detail in the manual, which is generally well written.

The controls are once again via the joysticks and the keyboard. One joystick (the manual doesn't tell you which — perhaps it is more fun to find out for yourself) controls the left/right banking of the aircraft and the two up/downs and the other joystick is used as the throttle lever. Keyboard characters control things like brakes, landing gear, flaps etc.

The pilot's view is 3D, but you can't really get much more basic — a display of angled lines show the runway. Again, the operation of the aircraft is fairly accurate, which is probably why the program is so slow. If you're looking for a pseudo-flight simulator then you might consider this one.

The program itself is not bad (even if it is in Basic). Perhaps it is unfortunate that DACC's flight simulator is being compared to Microcatal's as the latter is certainly well above the usual standard with superior features.

Program: 747 Flight Simulator	Cost: Supplier £9.95 DACC Ltd 23 Waverley Road, Grates Manchester M12 3BN
Modes of Flight	Cost: Microcatal 41 Turo Road, 88 Austin, Cornwall PL26 8JE

Draconian measures

Program: Draconian. Micro-robot. 41 Trow Road, St Austell, Cornwall. Price: £7.95

THIS is a space chase game that has similarities to both Phoenix and Asteroids as well as showing a certain amount of influence from Star Trek. The playing area consists of a series of interconnecting sectors each containing several irregular enemy lines. The object is to destroy these bases and thereby free extra multi-lead capture mode. The asteroids have then to be transported from one sector to the next, each stage getting progressively more difficult.

After choosing the background from a selection of black, white or green in the usual Tarn Mac fashion the display reveals the main view of the screen and a long range sector scanner on the right. The latter shows your position as well as that of the enemy bases. Your vessel remains in the centre of the playing area but can be pointing at any one of eight different directions by means of the joystick, while a background of stars and solar cells aids by giving the illusion of movement.

The fire button releases a stream of shots at the division of the ship's movement which

will destroy almost anything in the way. Unfortunately if you fly into the resulting explosion you too end up as a space statistic.

Should you manage to collect all the asteroids the sector scanner flashes at the top to show that the next gate is open and you can fly through this into the next sector. Points are awarded according to the number of asteroids safely transported through the next gate. To finish up the game, enemy vessels called Dragons occasionally pause you. Luckily these can be shot down which unfortunately is not the case with the Draconian, an unpleasant craft which appears if you take too long to destroy all the enemy bases.

There is an on-screen scoring system of two players can take part and the game is fairly graded, getting more difficult as you progress. About the only thing I don't like was the slow method of getting your name into the high-score table by using the joystick rather than the keyboard — a point less favourable from the arcade version.

John Stowers



Move over pole position — here's speed racer

Program: Speed Racer. Micro-robot. 41 Trow Road, St Austell, Cornwall. Price: £7.95

THERE HAVE been several attempts to produce motor racing games for the Dragon, but most show a view from above or from the side and fail to show all the features available for Amstrad or Commodore computers. At last there is a version for the Dragon that can compete with games like Pole Position — at least it's surprising what magnificent graphics have been achieved in Speed Racer.

When the game has loaded the background can be selected, although to get a

really clear picture it's worth switching colour in the play area and choosing a track (background). The two graphics are very clear and show a computer sitting in a chair, quivering with the race and author's name appearing on the monitor. The screen then clears to allow maps of four different circuits. Moving the joystick jumps from one to the next and pressing the fire button selects the particular track around which you race.

The display then shows the view from just behind the car with the track stretching away into the distance, complete with start/finish flag. The joystick controls left and right

movement as well as acceleration and braking, and the front wheels of your car can be seen swivelling. The speed of the game is so variable as every other car as possible. Indeed should you feel too slow enough of them you will find the game finishes after one lap. So that you know how many you need to overtake there is an indicator at the bottom of the screen next to the speedometer.

As the race starts, one thing that a newcomer is the attention to detail. The track swings from left to right and the back sprout of mountains, houses, bridges etc. moves as well, giving an excellent impression of actually being on a racing circuit. Racing on the track is not too difficult, but there are a much more subtle when you attempt to outmanoeuvre.

Should you crash one of the other cars, there is an explo-

sion and bits of the car fly into the air, complete with realistic sound effects. You are not permitted when you have a collision, but it takes some time to catch up with it. In fact when you restart, if your steering isn't at a steady beat and you veer on to the hard shoulder too frequently, the car stops and a little figure appears in a new pit of tyres.

Although I enjoy well written arcade games and simulations, it's not often that I find one that is so addictive as Speed Racer. When you've mastered the map circuit you can go on to one with more bends if you can feel it, make a figure appears with a chequered flag and your time is recorded under the circuit map. One of the best games I've seen for ages.

John Stowers



Jailbreak — Cuthbert rides again

Program: Jailbreak. Micro-robot. 41 Trow Road, St Austell, Cornwall. Price: £7.95

MICROBIAL HAS been producing Cuthbert games for some time now and there seems no end to the variety of screens he gets his self into. The first few were merely arcade games with a more elaborate plot, but they have gradually become graphic adventures of increasing complexity in the latest chapter in the saga we find Cuthbert trapped in a prison cell and camp. It's a free of speedily release.

The first screen shows an aerial view of the camp and the task is to get the key from one of the guards and take it to the gate. The number of guards varies according to the difficulty level chosen and ranges from two to eight. Cuthbert has to avoid the attention of these guards or else they will shoot at him. Luckily, the Cuthbert travels rather slowly and he can avoid them and even shoot the guards to avoid such difficulties. He glances extra points. Using the fire button speeds

up his progress but decreases the energy level.

If Cuthbert can reach the gate, he is faced with the problem of getting a safe identity papers from one of the guards and crossing a mine field a bridge. Using a system means the risk of quite often. The last screen shows him acquiring some money and leaving a boat towards the border. The graphics aren't bad in the game though not up to the most recent programs. Beyond the last screen the going gets quite tough. However, and you have to have your nimble fingers to reach the border safely. If you fail to avoid the guards or take an early bath in the mine field, there are two more Cuthberts waiting in the wings to join the struggle for freedom.

This game has a fair amount of originality to it, but doesn't have the compulsive nature of Cuthbert in the Jungle (still my favourite), and the overall program, although reasonable, isn't quite up to the standards of the series.

John Stowers



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Expansion port

Hywel Francis previews a new Dragon expansion system

RACE ELECTRONICS ised offering there is an array of add-ons to a Dragon expansion system. The expansion system comprises two separate parts: an interface cartridge with four LED indicators and the main expansion cartridge housing unit which is inserted in the users' pocket as the back-plate unit. The interface is housed in an A465 plastic case with top ports, whereas the back plate is a metallic, lined out of steel that has been plastic coated.

The two units are connected by a 50-way ribbon cable. The cable is permanently connected to the back-plate but is attached to the interface by an ordered edge connector and may be removed if you wish.

The interface cartridge holds the system buffers and the multiplexer. Once the system is booted, the grid can charge cartridges while the back-plate is switched off, but the computer is on. The back-plate has its own power supply, which is a must. The Dragon's own power supply is totally inadequate to run four separate cartridges at any one time.

The unit uses only one location of the Dragon's memory (RAM-PP). This location is filled with the number of the slot you wish to enable (0-3).

6809 interrupts

Interrupts are signals to the CPU to temporarily halt what the CPU is doing and redirect it to another task. The Dragon only makes use of two of the 6809 interrupts: the Fast Interrupt Request (FIRQ) and the Non-Maskable Interrupt (NMI).

The expansion unit handles any cartridge designed for the Dragon using three interrupt lines. However, problems may be encountered in the way that some cartridges handle interrupts. Switching from the slot containing the type of cartridge may result in an interrupt occurring at the switching moment, causing the processor to behave in an unpredictable manner.

To overcome this problem, the designers of the expansion unit recommend that such cartridges should be placed in any slot other than 0. The cartridge may now

be inserted in the usual way. When the time comes to add that cartridge you simply RESET the Dragon, which will default to slot 0.

One cartridge that handles the interrupts in an odd manner is Dragon Data's disk interface. Unfortunately, it holds one of the 6809 interrupt lines in an active-low condition during stand-by. But Premier DOS owners will be pleased to know that this interface does not behave in a suspect way.

Figure 2

PINS/TYPE CARD PINS/IO				
01	+5V	21	Address 2	
02	RD	22	Address 3	
03	WR	23	Address 4	
04	MR	24	Address 5	
05	RST	25	Address 6	
06	SR	26	Address 7	
07	SR	27	Address 8	
08	SR	28	Address 9	
09	SR	29	Address 10	
10	SR	30	Address 11	
11	SR	31	Address 12	
12	SR	32	CTS	
13	SR	33	data	
14	SR	34	SR	
15	SR	35	SR	
16	SR	36	PS	
17	SR	37	Address 13	
18	SR	38	Address 14	
19	Address 15	39	Address 15	
20	Address 16	40	SR, SR	

One method of removing cartridges from the back-plate is to switch off its power supply while allowing a supply to the computer. However, this will affect other the FIRQ or the NMI lines causing unpredictable behaviour to the 6809, which

usually results in a crash. Race has provided information on this. Note that users within their user guide to overcome this corruption of the interrupt lines.

The 16-page users' guide supplied with the system is concise and easily read. Besides containing all the points needed to run the system, the guide also gives details on how to utilize the Dragon 64's built-in ROM as well as using add-on ROMs to save up to 32K.

Three applications are fully documented in the users' guide. The transfer between Dragon DOS and the Premier Delta DOS and vice versa, BASIC and machine code programs from disk to EPROM, which can then be used in the sideways ROM board and the third application which describes how to download a program via ROM2 and store the data in EPROM.

Figure 3



Race also included a hard case of a relocation utility in BASIC and a 6809 assembler version written in position-independent code (PIC). The utility is actually two programs in one—the first is a 'keep' utility that takes the BASIC program from its original storage area and then stores it in a free part of RAM. Once the desired section of the utility may be invoked, which rewrites the program carried out by 'keep'. You now have a BASIC program in the right position for execution or saving via ROM2 to another computer or to EPROM.

Conclusion

This unit is extremely versatile. It really does expand the capabilities of your Dragon, whereas you just wish to have four game cartridges at hand, or create a powerful 6809 development system. A great deal of thought and development time has been spent in trying to create a product that could be used with every type of commercially available and home-made cartridge (even Dragon DOS) and it shows. The cost of the unit has not been inflated at the time of review, but it is expected to sell for around £130, which would make it a worthwhile investment. ■

Figure 1 Expansion system



Mastermind!

Jaiver Demeter presents a computerized version of the popular board game

THIS VERSION of the popular board game *Monopoly* has been written on a Windows 95.

You have to find the right colour combination of four different colours (don't enter the same colour twice in the same line). Clues are then given in the form of a flag, where you have found the right colour but at the wrong place. A green spot is shown for a colour at the right place.

To enter a colour, just press the colour (building) number (on left side of the screen). The order goes from left to right.

If after several guesses, you have still not found the colour combination you have lost.

Program Dates:

Topic	Date	Time	Location
Topic	Date	Time	Location
Topic	Date	Time	Location

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```
90 PLOT=1:1:1:CONTRAST=75 COLOUR=GREEN:1:1:1  
91 Y=250:Y=250  
100 END T=5 TO 7  
101 SE-19188=116
```

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```

102 Y=1-20:R=1-20
103 FOR I=1 TO 4
104 G=1-20
105 CH=INKEY$IF CH="1" OR CH="5" THEN 105
106 REM*****GETS COLOURS*****
107 CH1=INKEY$
108 IF CH1<>"1" THEN 110
109 CIRCLE(X,Y),R
110 IF CH1<>"5" THEN 113
111 CIRCLE(X,Y),R:PRINT(X,Y) & G
112 IF CH1<>"3" THEN 114
113 CIRCLE(X,Y),R:PRINT(X,Y),T
114 IF CH1<>"4" THEN 116
115 CIRCLE(X,Y),R:PRINT(X,Y),R
116 IF CH1<>"2" THEN 118
117 CIRCLE(X,Y),R:CIRCLE(X,Y),T
118 IF CH1<>"6" THEN 120
119 CIRCLE(X,Y),R:PRINT(X,Y) & R
120 NEXT I
121 REM*****RIGHTS COLOUR*****
122 CH=0
123 FOR P=1 TO 4
124 IF C/P<>"CHOP" THEN 126
125 CR=CR+1
126 NEXT P
127 REM*****END OF GAME*****
128 IF CR=4 THEN 144 ELSE GOTO 131
129 IF T=7 THEN 151
130 REM*****ARM, PLACE*****
131 RP=0
132 FOR P=1 TO 4
133 FOR R=1 TO 4
134 IF R=P THEN R=R+1
135 IF C/P<>"CHOP" THEN 137
136 RP=RP+1
137 NEXT R
138 NEXT P
139 RP=RP*****GETS GREEN SPOTS*****
140 IF CR=0 THEN 144
141 FOR P=1 TO R
142 SX=0-8
143 POINT(SX,SX)& A
144 NEXT
145 REM*****GETS FLICK*****
146 IF RP=0 THEN 151
147 FOR P=1 TO RP
148 SX=0-4
149 CIRCLE(SX,RX) & A
150 NEXT P
151 NEXT T
152 REM*****YOU LOST*****
153 CLS
154 FOR Y=0 TO 400
155 PRINTY+1, CH4,170:Y O U L O S T . . .
156 NEXT YL
157 PRINT840: "*****"
158 PRINT840: "P L A Y E R S P A C E S"
159 PRINT840: "*****"
160 PLAY"VIBR174,1,64,0-99,0"
161 G=1-20:Y=1-20:IF G=1 THEN 161 ELSE IF G=2 THEN 40
162 GOTO 80
163 REM*****Y'S DIB IT*****
164 CLS
165 FOR Y=0 TO 400
166 PRINTY+1, CH4,170:Y O U D I B I T . . .
167 NEXT YD
168 PRINT840: "*****"
169 PRINT840: "P L A Y E R S P A C E S"
170 PRINT840: "*****"
171 PLAY"VIBR174,1,64,0-99,0"
172 G=1-20:Y=1-20:IF G=1 THEN 172 ELSE IF G=2 THEN 40

```

Doodling

John Smith presents a turtle graphics type drawing program

SINCE IT is not too difficult to write a program which allows drawing on the Dragon's Tera screen, with the ability to give a screen dump on to the Tandy GCP 110, I decided to dabble with something approaching turtle graphics. The short listing which follows is approximately 2.5k long, and quite easy to enter. Even if you have not got a Tandy (or similar) printer, you will still get some potentially straight before wrapping in a full scale professionally written package.

Only four commands are used and each line is by no means a full eight minutes of turtle graphics, and the finished drawing often resembles the doodles on the corner of my handkerchief. I have converted this name to my life — GDD TLE.

On running the program you are first presented with two introductory screens with real subjects for entering data. At start up the program sets the drawing turtle at the centre, and facing towards the top of the screen (i.e. to 12 o'clock on a clock face).

The first request is to ENTER the length of the line that you want the turtle to draw. The units used are angle points in Principle 4. This means that a line going in any direction of a length greater than 100 will from the centre will give an error message of being off screen. Lengths of 40.00 should be sufficiently large to produce a useful size without producing this error.



Figure 1

The next request is for an angle. Since the turtle is facing up at the start, an input of 60 means that the first line will be drawn to the right (or 3 o'clock) while an input of 100 will draw to 4 o'clock and so on. The next command appears as FORWARD

which refers to the number of times you want the line of the length you have entered to be drawn at the specified angle.



Figure 2

If we take a line of 40 units and an angle of 120 degrees drawn three times, we will end up with the drawing in Fig 1. You will see that the radius of the line is clockwise (although this can be altered to anticlockwise by entering a negative value for the

angle) and that the angle is on the outside of the triangle as you do not specify 90 degrees to draw straight.

This gives a simple rule to drawing polygons, namely 360 divided by sides = the angle to be used for drawing. Thus a pentagon is drawn by 72 degree angles and an octagon by 45 degrees. With a sufficiently large number of sides the drawing approaches a circle (by angles of 18 degrees repeated 36 times).

The whole program relies on simple trigonometry to produce its effects and the equations used are at the subroutines on line 3000. Fig 2 helps explain how these equations are derived.

Since line 2 = A/C and cosine 2 = sin C, $A = C \times \sin 2$ and $B = C \times \cos 2$. Therefore $X1 = A + A$ and $Y1 = Y + B$.

Each time the subroutines are called, X1 and Y1 are recalculated for each new angle in steps by 2 (2 being the angle converted to radians by dividing by 180) or which equals 57.29577951.

The command to vary the line is LENGTH VARIATION. This changes the

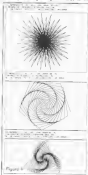


Figure 3

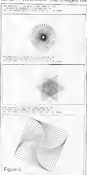


Figure 4

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Sequential files on tape

Robin Hamilton explains how sequential file techniques can be used to create a 200K database on tape

THERE ARE numerous database programming references for the Dragon 32, from the simplest to the most complicated, both commercial tapes and books published in magazines. Unfortunately most that rely on cassette rather than disk for data storage have a radical limitation — they exceed the 32K memory of the Dragon as an upper limit for the total amount of data which the program can deal with.

For simplicity's sake, 32K is used as shorthand for whatever amount of memory is left for string data after the Basic program has taken its bite and the memory has been further used up by

dimensioning arrays, assigning variables and so on. This will obviously be less often much less than the nominal 32K available initially after PCLBART has been executed.

The following sort routine is a standard version of the Shell sort, but it makes use of the Dragon's WAPPTR function. It can be between five and 10 times faster than a sort program which directly switches arrays rather than (as this does) switching the array pointer (% = number of items to be sorted and @ = number) is the array holding those items).

Here, you should examine the LOAD

and SAVE routines. These come in two forms. The simpler reads or writes a number at the start which gives the number of items in the array to be saved or loaded. This number is then used when reading or writing data to or from tape. To indicate when to stop loading or saving. For our purposes, the in-queue version as it effectively prevents a file on tape from being reloaded if one already in the computer. The routine to save more complicated but more elegant is the one which employs the Dragon GOF function.

There are a number of techniques which can be used to extend the limit to the maximum amount of data which can be held on cassette rather than in Ram. Conceivably, a two-hour audio-tapester could be used to hold the data (but this is an overkill in terms of time — processing the final item of data on a two-hour cassette however you go about it does take two hours). But using the techniques described here, it should be possible to create a database of about 200K on a C80 cassette, and access it relatively easily.

Original database

There are certain features your original database program should have. These are:

- Facilities to create files.
- Facilities to insert, amend and delete records.
- Facilities to loading more data on tape.
- Facilities to unloading on tape.
- A sort routine to arrange the records in order.

All these routines are fairly standard. The only one which is sometimes omitted from database programs is the sort routine. If you are buying a database program or building one from scratch make sure you pick one with a sort routine. If you have a database program without a sort routine, write one in as a sub-routine.

Here are the bad and the good versions (Figs 2 and 3) — if you know the former, simply replace it by the latter. Both versions presuppose a variable N in the program which holds the number of items currently in the file, and an array @%@% number greater than N, created by the program to hold the records.

The purpose of the variable is to

```
7300 REM *** SORT SUBROUTINE ***
7305 N=N-1
7310 GOTO PRINT "SORTING ... PLEASE WAIT"
7320 Y=1
7330 Y=255
7340 IF Y<N THEN 7330
7350 Y=INT((Y+1)/2)
7360 IF Y=0 THEN 7330
7360 IT=N-Y
7370 FOR I=1 TO IT
7380 J=1
7390 @%J+Y
7400 IF @%N<@%J THEN 7440
7410 NEXT I
7420 GOTO 7350
7425 GOTO PRINT "SORT COMPLETED"
7430 N=N+1: RETURN
7440 FOR C=0 TO 2
7450 B=C: IF B=0 THEN B=B+1
7460 Y1=PEEK(WAPPTR(@%N+1)*B)
7470 Y2=PEEK(WAPPTR(@%N+1)*Y)
7480 PEEK(WAPPTR(@%N+1)*B),Y2
7490 PEEK(WAPPTR(@%N+1)*Y),Y1
7500 NEXT C
7510 B=B-Y
7520 IF B=0 THEN 7490
7530 GOTO 7410
```

1000 and their use at line 1020 rather than the more obvious 1700 to advantage at due charge. This part of the routine is actually simpler than the earlier version since you don't have to print the number in the tape to start with!

This routine is at once more elegant and less tricky to understand than the earlier version. What I do do is find the tape and if the end-of-tape marker is encountered, return from whence it was called. Otherwise it increments the visible counter (holding the number of items in the file) by one, reads one data item from the tape into the array set up in the program to hold the records, and then reads the previous and the stored file number as found. At this stage, it will return to the main program with N set to the number of items currently stored in it. If there is a gap at the program to deal with (again N will equal the number of items loaded if the program already holds data, then N equals the number of items held plus the number of items loaded).

```
1000 REM *** SAVE ROUTINE ***
1010 OPEN "S", B: L=LEN(B)
1020 PRINT B-1, L
1030 FOR A=1 TO L
1040 PRINT B-1, B(A)
1050 NEXT A
1060 CLOSE B-1
1070 RETURN
```

```
1000 REM *** LOAD ROUTINE ***
1010 OPEN "T", B-1, "R"
1020 INPUT A-1, N
1030 FOR A=1 TO N
1040 INPUT B-1, B(A)
1050 NEXT A
1060 CLOSE B-1
1070 RETURN
```

Fig. 2

Incidentally, if you want to save a string beginning with double quotes, simply to begin INPUT by LINE INPUT. This allows the string to exist and has the same contents as LINE INPUT taking data from the keyboard.

With a SORT routine included, and the TOP version of the LOAD/SAVE routine, we now have the program saving and can refresh within the DOS limit. Now we add the file:

```
1000 REM *** LOAD FROM ADDRESS ***
1010 OPEN "T", B-1, "R"
1020 FOR A=1 TO L
1030 INPUT B-1, B(A)
1040 NEXT A
1050 CLOSE B-1
1060 RETURN
```

```
1000 REM *** LOAD ROUTINE ***
1010 OPEN "T", B-1, "R"
1020 IF B-1 = "END" GOTO 1070
1030 INPUT A-1
1040 INPUT B(A)
1050 NEXT A
1060 CLOSE B-1
1070 RETURN
```

Fig. 3

The first bit is the ability to APPEND files from tape which will be explained later. This will enable you to create two separate files, add them together, and

merge them using the SORT routine (assuming that is that the files are in the same sort — for example, a single string held as part of a string array). Even the last can be useful. If you can imagine five separate Dragon programmes each putting some items into a database on their individual computers, then getting together to compare the files is often a bit of a

task. The second part of the original file and the second part of the new file. Save this file on the same tape that you saved the combined part one immediately after it. If this is done correctly, you will now have a cassette containing approximately 60% of data in an ordered sequence.

The purpose of the address B and C should not have emerged — they should

```
2000 REM *** SPLIT FILE IN TWO ***
2010 INPUT "BREAK FILE AT WHICH LETTER": LB
2020 M=1
2030 IF LEFT$(B,LEN(LB)) THEN 2050
2040 M=M+1: GOTO 2030
2050 INPUT "PRESS ANY KEY TO SAVE FIRST FILE": M
2060 B-1: B=M-1
2070 GOSUB 1010
2080 INPUT "PRESS ANY KEY TO SAVE SECOND FILE": M
2090 B-1: B=M-1
2100 GOSUB 1010
2110 PRINT "SAVE COMPLETED"
2120 RETURN
```

Fig. 4

they would spread the misery of data entry two ways.

When the program is first run, M is set to 1. This is because the program creates an end-of-tape marker when it is set up, which will always come at the end of the last file it is saved on tape. This means many will assume an option 3 LOAD FILES FROM TAPE. When option 3 is chosen, you are sent to the LOAD subroutines at line 1000, the file is loaded from tape, and M is now set to the current number of items in the file. To append a further file, simply use the same option as a single.

As the new file is loaded, M is incremented by 1 so each record is again read when the file has finished loading, you're returned to the main menu with M now reset to the number of items in the file currently held by the program. You can now carry on adding files up to the limit of the computer memory, and merge these files into one by means of SORT.

Assuming that we have now created a data file which takes up the whole of the available computer memory, and wish to add to that, what do we do? This is the second bit: the reverse of APPENDING files. We break this file into two parts (Fig. 4).

By the use of the routine, we can create two separate files, each of which (initially) will take up approximately half of the available computer memory. Further items can now be loaded into the file.

First, start a completely fresh file and insert records up to the limit of available memory, or until you reach a convenient point to process the file. SORT this new file into order and divide it into two at the same point that you decided you'd split it. Close the program, and load in the first part of the original file, then append the first part of the new file to that, sort the result, and save the new large sorted file on a fresh tape.

Next, clear the program and do the same

to break into the SAVE routine, and specify which parts of the file currently in the program are to be saved. These would originally be set up as part of an end-of-tape routine, something like the sample in Fig. 5.

The process of splitting files, adding to them, and reordering, can be done indefinitely up to the limit of data that the cassette can hold. The problem with this is that only part of the data can be held in the Dragon's memory at any one time.

```
1000 PEEK(B-1): CLEAR 20000
110 DIM B(10000)
120 B-1: B=1: E=1
130 B(0)= "*****"
```

Fig. 5

```
100 CLR
100 PEEK(B-1): CLEAR 20000
110 DIM B(10000): DIM T(100)
120 B-1: B=1: E=1: C=1: CT=0
130 B(0)= "*****"
```

Fig. 6

To get round this problem, we create a routine to search each of the files on tape one after the other, and to place the results of this search in an array which has been divided equally to hold them. At the moment, our initialization routine has created an array D(50) to hold our records, and sets B=1, B=1, E=1. We now add T(50) to create an array of 50 elements to hold items found by the search program, and a variable flag CT, which will signal whether the search routine is to simply scan the file currently in memory, or is to load further files and scan these too. The beginning of our program will now read something like Fig. 6.

A very primitive search routine, which would search through a complete file for

the occurrence of a specified string, and store the results of this search in a temporary file, as contained in Fig 7.

Lines 3080 and 3070 mean that if the CT flag is set to 1, so is the last record in the current file is 2222 (the end-of-file marker). Thus the search will be terminated after the current file in memory has been searched. Otherwise the computer will automatically load a further file from tape search it, and store the results of the search in TS. Lines 3080, 3080, and 3100 form the loop without destroying the contents of the database, call the LOAD subroutine, and start the SEARCH routine once more on the new file just loaded.

Automatic scanning

If you want to simplify the process, or make the searching of multiple files automatic, simply omit lines 3005, 3006, and 3080.

Assuming that the files to be searched are stored one after the other on a single tape, then the computer will get on with the job of searching without needing any attention of the search has been completed. The process may be time-consuming, but so is automatic; you can busy yourself at other pursuits (or trying to work out where to get the money to buy a disk drive, and make such expedients as this unnecessary) until the search has been finished. Possibilities here would be to make the computer set off a repeated beep when the search is finished to draw your attention to it, or have the search output its results to the printer rather than

```
30000 REM *** SEARCH SUBROUTINE ***
30005 CLS: INPUT "SEARCH MULTIPLE FILES (Y/N)"; N$
30010 IF N$="Y" THEN CT=0 ELSE CT=1
30015 INPUT "TYPE IN WORD TO BE SEARCHED FOR"; W$
30020 T=0
30030 FOR A=1 TO N
30040 IF INSTR(DB(A),W$>0 THEN T=T+1: TS(T)=DB(A)
30050 NEXT A
30060 IF CT=1 THEN 3000
30070 IF DB(H)="2222" THEN 3000
30080 FOR A=1 TO N: DB(A)=": NEXT A: N=N+1
30090 GOSUB 1200
31000 GOTO 3000
32000 PRINT "SEARCH COMPLETE"
32100 RETURN
```

Fig 7

storing them in a temporary array in the computer memory.

With these reasons for a simple routine implemented as part of your database program, this program will now be able to deal with a much greater amount of material, both in terms of storing this material and processing it. The examples given in this article are obviously far closer to the real system as can be, but this is no reason why the same techniques — of expanding files, splitting files, merging separate files, and searching through a multiple set of files on tape, can be incorporated into the routines of much more sophisticated database programs.

The most difficult technique to imple-

ment is probably the routine to search through a series of files, but even this is fairly straightforward if you recognise what is being done — rather than inventing the search when the file is opening has been examined a search has failed and the search routine is simply meant an alternative file. The pace paid for using the database in this fashion, as it were a sequential disk drive, is not so much the only one thing that will save the Dragon database routines are very much the same as certain disk routines, but the time it takes to access data. However, even this is partly compensated for since such access is automatic, and the computer can be left to attend to this by itself. ■

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Task Master

John Nash looks at some of the mysteries of the interrupt routine

MULTITASKING IS common on larger computers and refers to the operation of two or more procedures or programs at the same time. Actually the programs are interleaved so that, for example, the processor can update the video display while waiting for the operator to press the next key. One way of achieving this is by using interrupts.

Interrupts are signals sent to the processor, for example a peripheral is ready to donate or accept data. They cause the processor to check enough information to remember where it was working. Then jump to the interrupt service routine. When the service routine is finished the processor can return to its previous task. The effect is rather like being called to dinner while you are reading your newspaper's manual you mark the place then go to

dinner (service the interrupt). Afterwards you carry on from the place you marked.

How does this apply to the Dragon? You may have noticed that the Dragon becomes totally unresponsive while printing programs or data on to paper. This is because the processor waits in a loop constantly checking a flag for printer input busy. As soon as the flag is clear the next character is sent to the printer (to see how this works inspect your ROM contents from \$A000 to \$B000). The loop wastes a lot of time, so the printer is very slow compared with the processor.

There is an alternative method that can be used — the printer has an acknowledge ACK line which is connected to the IRQ (fast interrupt) input and can be used on machines with it. The Dragon counting system does not use it. Two examples of

programs using the interrupt are described below.

1) A Basic program later (Fig 1) which first copies an expanded (ie de-interleaved) version of the listing into upper memory. This is necessary to enable the Basic program (and especially control line buffer) to use the listing so that you can actually see something useful while the program is listing. You will find that you can now use the Basic system to edit, calculate or even program while the printer is working. There is a limit on program length of about 500 bytes, but you could fit in a longer program by doing a PCLEAR operation with PC=4. The program will send you if the expanded version is too long to fit into the top half of memory.

Address	Comment	Machine Code
10000	START	00000000
10001	LDX #0	00000000
10002	LDX #0	00000000
10003	LDX #0	00000000
10004	LDX #0	00000000
10005	LDX #0	00000000
10006	LDX #0	00000000
10007	LDX #0	00000000
10008	LDX #0	00000000
10009	LDX #0	00000000
1000A	LDX #0	00000000
1000B	LDX #0	00000000
1000C	LDX #0	00000000
1000D	LDX #0	00000000
1000E	LDX #0	00000000
1000F	LDX #0	00000000

Fig 1

2) This is an interrupt-driven printing routine (Fig 2) which can be used with a word processor. It assumes that the text will start at address 10000 decimal and the following codes are used:

CHAR#1 HIGH LINE
CHAR#2 LOW LINE
CHAR#3 CHAR#4
CHAR#5 CHAR#6
CHAR#7 CHAR#8
CHAR#9 CHAR#10
CHAR#11 CHAR#12
CHAR#13 CHAR#14
CHAR#15 CHAR#16
CHAR#17 CHAR#18
CHAR#19 CHAR#20
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These could be altered to suit local requirements. Both routines are intended as illustrative.

Some of the interrupt control method is encourage you to experiment. Please use any parts of them that seem useful in your own programs.

To load these programs, first clear the memory space.

CLEAR 20000000 TO 20000000
CLEAR 20000000 TO 20000000

Now load the hex dump into DATA, address 10000 (page 4 of 4). The left hand column holds the addresses where the remaining 16 columns add the

data (instructions). Do not therefore load the left hand column. Your first DATA line for INSLIST should start:

10 DATA 10 10 10 10 10 10

When you have loaded all the DATA into memory, enter the following:

1 INPUT START:PRINT 0:IF
2 HIGH NOT 100
3 CLEAR AS POSITION 100:IF 0:GOTO 10
4 GOTO 10

and RUN: START is 20000000 and FIN

DRAGON OPEN FILE

Send us your Dragon programs, beginning with a general description and then explaining how the program is constructed. Take care that the listings are all bug free, enclosing a cassette and, if possible, a printout. We pay £5 for each original bug-free program published, double for the program of the month. If you have any problems with the listings, please send your queries to the appropriate author, Dragon User, 12-13 Little Newport Street, London WC2H 7PP.

Brick

From our top up Dragon to Apple with
BASIC is yet another version of an old

favorite, which seems to originate in a certain orphan in this one the ball is malleable in two directions and a degree of skill is required in order to master the game. A word of warning though, it can be mildly addictive. Apart from asking for another game, all control is by means of the right hand joystick and its fire button.

All of the game is played between lines

220 and 400. Direction of travel after a rebound is determined by a set of sub-routine lines 560-600 which are called according to the flag set at line 270.

Should you stop the game by pressing the BREAK key then be sure to press the RESET button before you attempt to start or save from tape because the LCD is upset by the higher speed set in line 10.



Figure 4. Change in the *Staphylococcus*

The score is made up of measure points, a screen bonus and a life bonus and you have to contend with a time-losing Mun-tun that uses a limited supply of flesh as

The essential items of the program are 20-1120 followed by 1240-1770 which determine the type of game and the final score. The remainder are sound effects, the pace and detailed instructions.

The variable `MT` (row 150) gives the amount of air available (20 and 0 relate to the level of play). Line 160 determines the number of treasure points you can pick up, and this is related to the level of play. It takes some working out but is there to be subtle. The time bonus is created by `MC` (line 170) and the bonus to one, `MC2`

You may go over a treasure square several times but as you leave a trail behind you, you may lose track of where you are and get eaten by the spider. The movements of the spider are deliberately made fairly predictable to make spotting a number of skills and give hints.

To save your typing on paper form on the recorder and type full words. You can delete up to four times.

1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 26

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MIKE GERRARDS ADVENTURE TRAIL

WHEN I WAS in Wigan at Christmas I noticed a distinct lack of Samurais around the town, but that doesn't stop a company from calling itself Samurais Software. If you send \$2.95 to their offices at 416 Liberty Street, Wigan, you will receive in return a copy of their adventure, *Castle of the Skull Lord*, along with a free Dragon dust cover which is a generous addition, though I wish I could be equally generous about the adventure. But your old boss reviewer has to be honest and say it's not the best he has ever seen.

The Skull Lord is a roommaster who even allows and forbids a sort of noble duels, and now it's your duty to go into the Skull Lord's castle and retrieve a hidden treasure for the darkness, which was among the treasure stolen by the evil Skull Lord. The game is not only, as are all the adventures this month, and accepts the usual two-word commands. For some reason there is no SAVE routine, which is a glaring omission as the BASIC program boxes quite a check of memory to play with in the Dragon. Once you've worked out the solutions to the first few problems, you don't want to continually go through them every time you load the tape, or encounter an unexpected death while you're playing.

The game begins with you on a barren plain, signs of war visible all around you as soldiers are slain, and you can also see a star in the north and there is a withered tree, and if you **SAY TREE** having first taken the precaution of climbing it you will obviously produce a stump and in our Amazing stuff I'd have expected a stump and a withered tree, might that be or not an adventure for the reader.

Armed with an axe, you pick a boat and having loaded it, you discover the limitations of the inputs allowed for in the program. Type **NOW** or **NOW SOUTH** (you're on the north bank of a river) and you're told: You can't do that yet, which is misleading as the command which works is **NOW BOAT**. The word 'Yet' implies you need another object or to perform another task, not simply that the command is wrong.

Other examples of careless programming include a sequence in the mountains where your progress is blocked by an avalanche. And having found a spine to DISMOUNT the avalanche trap

opens every time you pass the location. The need for a SAVE routine is emphasized by the fact that if you reach the castle entrance fail and go **WEST** you're told: You are in a cell. There are no exits, but the south wall looks very unstable, ignoring the question of how you suddenly got in there if there are no exits, and that you shouldn't be rewarded without warning you already used a SAVE routine to experiment with problems like that. The tasks aren't difficult and even with a free dust cover I can't really recommend this one.

For me I wildly enthusiastic about Franklin in Wonderland from Salamander, the first of what would have been a trilogy had the company not decided the Dragon adventure market was too tiny. As it is, Franklin in Wonderland is available for sale in a leather retold cover and instructions, but replacing the plastic with the correct cover in Japan. I go ahead with my grudging comments, fear in mind that I didn't think much of Dan Diamond either, which I know puts me in a minority so far as Dragon adventures go.

My major complaint is that whatever way you go at the start, you are in a maze with no way of getting a map through

Drop your sword, and that's the last you'll see of it. The first time I played I got through by trial and error, rather seeing a game as I could start beyond the maze, but several times after that I spent a further 10 minutes at the keyboard inventing a maze, testing the same type of an assumption literally hundreds of times before giving up in frustration. Breaking into the program (it is in BASIC and unprotected) showed that there seems to be a random element at play in this first location, deciding whether you're able to get out of it or not. I'm prepared to be corrected on that, as it's hard to be certain without a full program listing, but it's a real edge of adventure playing.

Getting into the game has you falling down a deep dark hole into Wonderland leading to magical encounters with the Head Hunter, March Hare, Cheshire Cat and so on. But I was disappointed with this and with Salamander's other 'no title' adventure, *White Castle* which gave me an **OUT OF MEMORY** error whilst loaded. That's a long no title too far!

Best of this month's batch (perhaps not I thought) is *The Shrunken Scientist*, a bargain at £5.95 from a company new to me, Cuckoo Software, at 67 Old Hanning Road, Boscawen, Warrs EN10 0PH. The title sets the story as due to a slip-up at your lab you find yourself only one-inch tall, only able to negotiate your tall height by getting to the top of the lab table and using some of the crystals that are there. A brave Mountain in your lab allows you nothing else, it shows you what an utterly sick you are around the lab. On your travels you find nasty snakes, bats or whatnot shall I name names, even fragments I'd sack the cleaner myself! Great fun is had with the new perspective you've got, food also becomes lakes, insects become mountains (and there are plenty of those, though DOF wasn't wonderful).

I've been having great fun with this adventure, discovering how to deal with the spiders, the frog, and how to get out onto the window ledge without becoming a cactus, for instance. But I haven't yet figured out how to avoid being hit by a snake, nor to get all the shut button safely. The game has glaring faults, like no SAVE feature and sound effects which look like machines forcing you to **RESET** (this happens in two places) but despite that it's enjoyable. ■



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handset), with our superb C.A.D. 32 program, using HBX graphics draw: lines; circles; ellipses; boxes; fill in areas in four shades, scroll up and down (using joystick); get and put, to move or repeat shapes; plus two sizes of text graphics.

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requirement for an on-screen menu which allows full use of the screen area for design work, you can now sit back and relax while your Dragon does the hard work. The screen dumps shown here are all produced with C.A.D. 32 using the delta 14b handset and interface. (Project X was designed and produced within 90 minutes). Finished or part finished designs can be saved to tape or disk and reloaded for printing or amendment. There is insufficient space here to describe fully everything C.A.D. 32 can do, so why not come along to the next 6809 show and see it for yourself.



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Book: *The Pongon Book of Personal Computing*
Author: John Gribben
Publisher: Pongon
Price: £5.95

THIS WILL be a very short review — this book is absolutely superb and I really have to fluff it just out. No matter how the ignorance it will however provide the educational reader with the clear introduction to computing up to a standard somewhere in-between of *Q-level Computer Science* (the syllabus of which assumes that its student does not own a computer).

Within its pages are covered the development of the micro and personal computer, computer architecture, I/O, program development, programming languages, software, networking, system selection and a comprehensive contents list. Index and the appendices are well as a list of every illustration.

The computer book has matured and come down in price. Three years ago had a book of this quality been available it would have cost many more pounds than this excellent tome. The author is an experienced ICL programmer and a shrewd. He has a proper well written and very well documented.

This book stands proud upon my bookshelf. I have nothing more to say.

Jason Gribben

Book: *Forward 100*
Author: Ray Harrison
Publisher: Hays
Price: £12.95

MUCH HAS been said in the media recently about the battle graphics based language 1000 — the successor to Basic and Pascal in the "every computer should provide it-as-standard" argument. This book does not set out to continue the argument nor does it try to teach the 1000 language rather it sets out to explain what it is like as about. Harrison suggests that 1000 has a tremendous status in the educational field because it teaches children to think logically and creatively whilst at the same time being

but. The theme of the book is best explained by Harrison in the first chapter.

It is easy to observe a child to learn LOGO. The problem is to explain its important side of life.

The point of LOGO according to the author is not the syntax and power of the language itself but the new approach to education that it allows. Harrison sees it as paving the way for an educational revolution.



Schools of the future will be centers of exploration with computer and databases providing information. Teachers will become guides rather than deliverers.

It all has a fresh mind running along with it. The author's obvious enthusiasm for the subject is infectious and I found it hard to put the book down. Although at £12.95 it is rather expensive to buy it is definitely worth going to your local library and ordering a copy.

David Rowlands

Book: *FORTH for Micros*
Author: Steve Oatley
Publisher: Newnes
Price: £9.95

BY NOW every Oregon user must be aware that he or she is not stuck with the limitations of Basic as supplied with the machine. If program speed is the problem the solution is obvious: buy a Basic compiler or use another language altogether. Assembly language gives the fastest of all is

very badly to use and taking so many people time to learn these languages like FORTH.

FORTH for Micros attempts to teach the language to those with programming experience in either Basic or Pascal and points out that it is not an introduction to the subject of programming itself.

The book starts by introducing concepts such as stacks and reverse polish notation (the mathematical notation used by FORTH), and quickly moves on to simple programs. The early examples are given in Basic, Pascal and FORTH to make it easier to see what is going on. All of the usual topics are then introduced: selection statements, looping constructs, arithmetic, data types, input/output, writing up with a look at implementing large programs. The example programs shown include a multi-dimensional array implementation — a facility not available in standard FORTH. At the end of each chapter there are a selection of self-test exercises.

FORTH for Micros is a well written book that covers the main points of the language in an easy style but there are a lot of FORTH tutors on the market about which are hard to say the same thing. There is nothing that makes this book stand head and shoulders above the rest.

David Rowlands

Book: *ARCAD Games in BASIC*
Author: Bruce King-Bell
Publisher: Newnes
Price: £14.95

THIS IS a nicely designed 150 page guide for your type of book. Not much more need be said. If this is your type of book then this one is excellent in its field offering complete versions of Break-out, Snake, Scramble (which has machine code in it — a fact which makes the title of the book somewhat doubtful) and

The programs are of a standard slightly above those you would find in computer magazines and they are very well documented, but almost every

one relies on the speed poke for one reason or another and they are in BASIC which is not a good language for arcade games.

The book is well written and I was pleased to see that it does not take time to its readers. It is not a reader with a lot of insight of intelligence at times although the game in the authors leave a lot to be desired. Nobody means here why the war began. All that is known is that in the nuclear age the earth has quickly become war ravaged. All it needs is an "it was cold too cold" and it will be a best seller.

The book's approximations are fairly competent and complete giving Code Basic versions of the games for those within Co-Co and the Extended Basic. Cambridge (the Dragon comes with Extended Basic as standard) an index of the major logical topics covered in each chapter in keyboard reference table, joystick, zoning and the like, and a bibliography of useful points and points not all of which seem to exist (this could be because the book was quite obviously written for a Co-Co and extended).



Overall then is a superior member of the instant game of book, but as I have said of the Zap Pow and Bang with 50 games for you at your leisure. Then this is your book. And it is it may well be worth a look by programmers as it does prevent some good examples of good programming techniques in the word game for the programs by high definition are not attractive.

Jason Gribben



... give you a picture of living by wigs, waxes of hair, and other tools, that make the behavior game, practically impossible. Help guide WILLIAMS' through the maze, increasing in difficulty waves. By means are provided from each end of the spectrum to the other, increasing in abundance.



Competition Corner

Answers to Competition Corner
Dragon Users, 12-13 Little Magazine
Stoke, London WC2H 7PP

Reach out for the sky

Microdeal provides the prize to Gordon Lee's computation competition

IT HAD BEEN said that there are more ways of jangling the order of a pack of playing cards than there are atoms in the known universe. If this mind-blowing though totally useless fact grips your imagination then it is probably you are one of the new breed of abstract number-ologists. On the other hand if it makes your head swim then you are definitely not a suitable candidate to explore the dizzy heights of number dozing.

While on the subject of large numbers and playing cards, did you know that the odds of dealing a perfect bridge hand — a

card at which each player receives a complete suit — is only once in 2 225 197 406 895 366 566 561 566 800 deals? Put another way, if the entire population of the earth sat down in bridge fives and did nothing but deal hands at the rate of one a minute, it would take over three million thirty million years for such a hand to occur. Another odd fact would come to light if the entire world's population were to stand along the equator. Even if we were to assume that the equator ran all the way over land it would only allow a space of one third of an inch for each person. However if we were to allow a space of one square yard each the population would cover one third and two hundred square miles — a bit less about the size of the county of Suffolk.

How many times have we heard it said that someone is worth their weight in gold? Taken literally with gold costing £300 an ounce an average individual weighing eleven and a half stone would be worth over three quarters of a million dollars. Moreover, as gold is the most durable of all metals this amount could be drawn out into a line over one hundred thousand miles long! Goldfish for a moment one million pounds. Although in 250 miles it would be into a subcube, if it were paid in penny pieces it would have a stacked height of 65 miles and a total weight of 260 tons. Also if these coins were laid out in a straight row they would stretch 1245 miles — about the direct distance from Glasgow to Rome!

When in Rome . . .

On the subject of Rome, have you heard the joke about the ancient Roman who kept missing the bus because he thought that 11 11 was his number past two? Apart from being totally impractical for even basic arithmetic the Roman number system has no letter for zero. Other countries have missed the longest date so far on the calendar which was 1888 with the number seven, MDCCCLXXXVIII, and the fact that with thirteen in the date it is for 4 or 6000 years rather than the correct number 19. Another odd stock statistic is that the British hand of Big Ben has travelled over 15 000 miles since 1659.

To work out that last figure we would need to know the length of the hand (148) and the value of π (3.14159 . . .) If you wanted to be really accurate, π has now

been calculated to over eight million decimal places. Other large numbers include the largest prime number found so far, $2^{697261} - 1$, which has 207 901 digits. From this can also be calculated the highest 'perfect' number to be discovered, $2^{697261} \times (2^{697261} - 1)$, a number with 79 542 digits! A perfect number is one where whole number divisors including 1 but excluding itself add up to that number. The two smallest perfect numbers are 6 ($1 + 2 + 3$) and 28 ($1 + 2 + 4 + 7 + 14$). After this comes 496, 8128, 33550336 and 8589869056.

Record breaking

When large numbers are concerned, the science of astronomy has some real record breakers, so much so that they are often difficult to imagine. However, if we could reduce the earth to the size of a grapefruit we would find the following curious facts. The moon would have a diameter of one inch and would orbit at a distance of nine and a half feet. The sun would have a diameter of 26 feet and be three quarters of a mile away, where Pluto, the outermost planet, would be at a distance of twenty five miles. On the same scale, Mars's Geminus, the pair's nearest neighbouring star (actual distance 4.3 light years) would have to be placed on the surface of the moon!



This would seem a good point at which to break away from the realm of totally useless facts, all of which can be easily calculated by computer. At the beginning I was afraid that there were more ways of jangling the order of a pack of cards than there are atoms in the known universe. This month's competition is to compute this exact number! It is quite very hard to get this to find an approximation, but we require the number precisely. (Has the number you are after an $52^{11} - 1$ or $52^{11} \cdot 51^{11} \cdot 49^{11}$ etc.)

Prize

MICRODEAL is offering 15 weeks the chance to win tickets of flight to and from any new flight simulator for the Dragon.

December winners

THE FOUR redress the loss of prize this year at a distance, the fun of being and the loss of space. Britain's 150 years old (100 next birthday). The winners will each receive one of Mike Jolly's calendars, one A. Wilson of Darnley, C. Jones of Uxbridge, Jason Emery of Birmingham, S. Mullinson of Chelms, M. Gordon of Tottenham, David Fowler of Hertfordshire, R. Gilling of Bristol and Mark Hooper of Luton.

Rules

TO WIN a copy of the game you must solve the answers to the competition and have it sent in with the use of a Bann program developed off your Dragon. Please do not send in a message containing the answers. As a 15 letter string, the following answers in 10 words or less. I would like to try to solve.

Your entry must arrive at Dragon User by the last working day of March. The winners and the solution to the puzzle will be published in our June issue. Entries will not be acknowledged and we cannot enter into correspondence on the result.

St. George now has two choices!

Red or green will slay the Dragon

- ▲ Nylon encased-Steel shafted Joystick with ball and socket joint.
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The smooth control of the Voltmace delta sprung return joystick is now available to Dragon owners. Each joystick has been individually tested before it leaves our factory, following extensive robot testing to prove the design (our record is more than a million cycles). This means that not only will your joystick be strong, tough and reliable, but it ensures long life, accurate control and with the choice of red or green five buttons, gives instant recognition between the left and right joysticks.

If you are not completely satisfied with the sales 30, returns it to us within seven days for a full refund.



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